Science Mission Directorate

Program Update from NASA HQ

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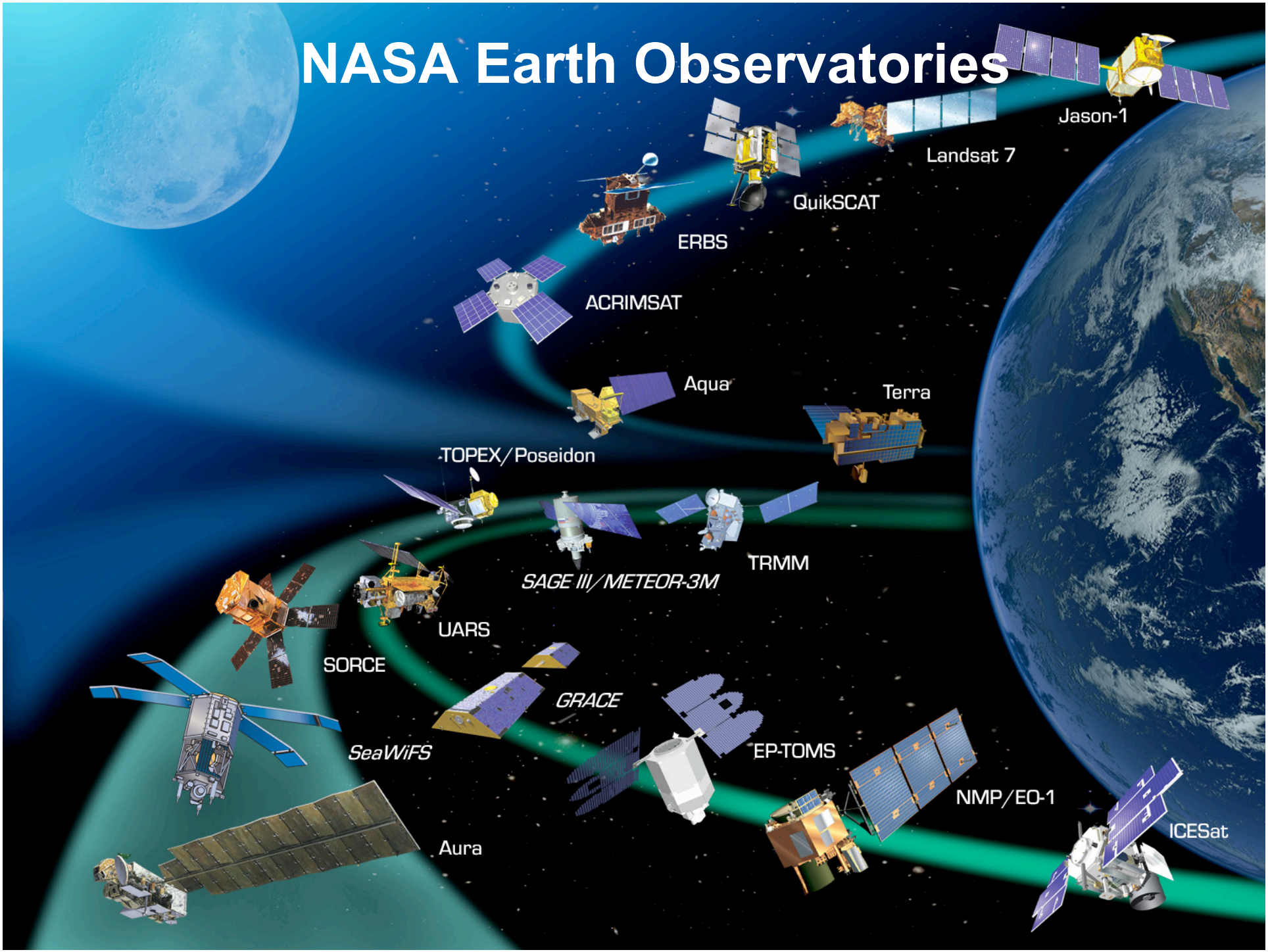
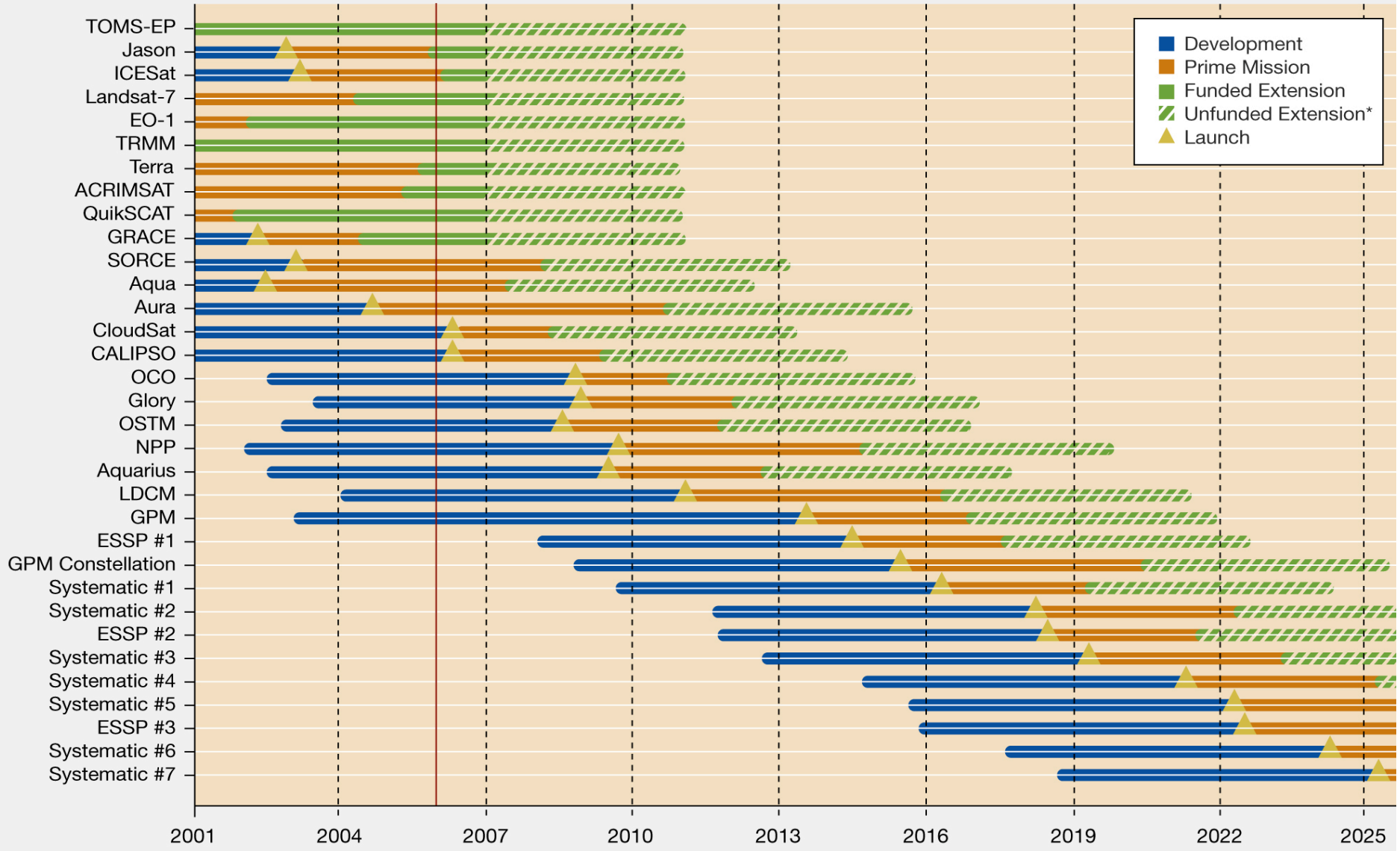
Weather Focus Area Leader
Program Scientist for TRMM, Aqua and GPM
March 27, 2007

Program Update

- AIRS/AMSU going strong
- Dr. Alan Stern is the new AA for SMD
- EOS re-competition
- NRC Decadal Survey
- Senior Review

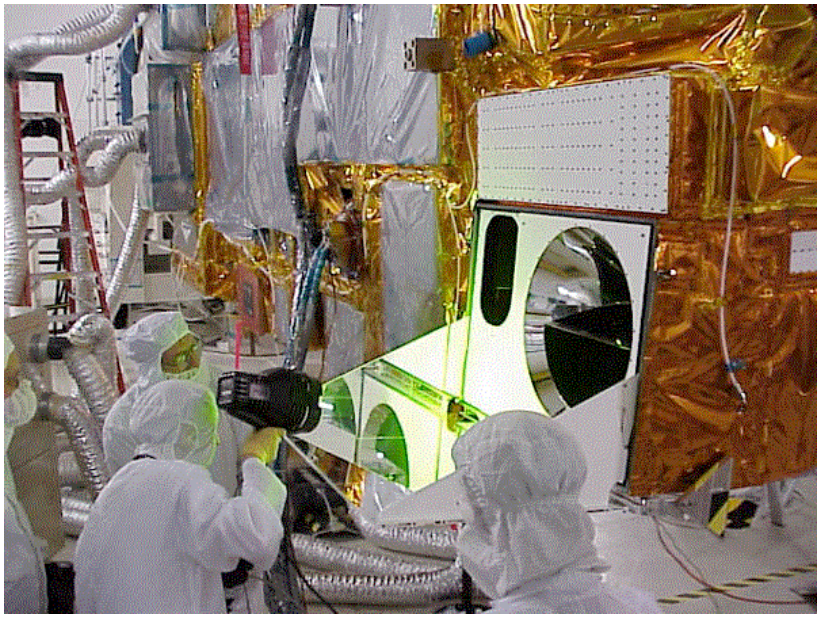

NASA Earth Observatories
Jason-1
Landsat 7
QuikSCAT
ERBS
ACRIMSAT
Aqua
Terra
TOPEX/Poseidon
TRMM
SAGE III/METEOR-3M
UARS
SORCE
GRACE
SeaWiFS
EP-TOMS
NMP/EO-1
ICESat
Aura

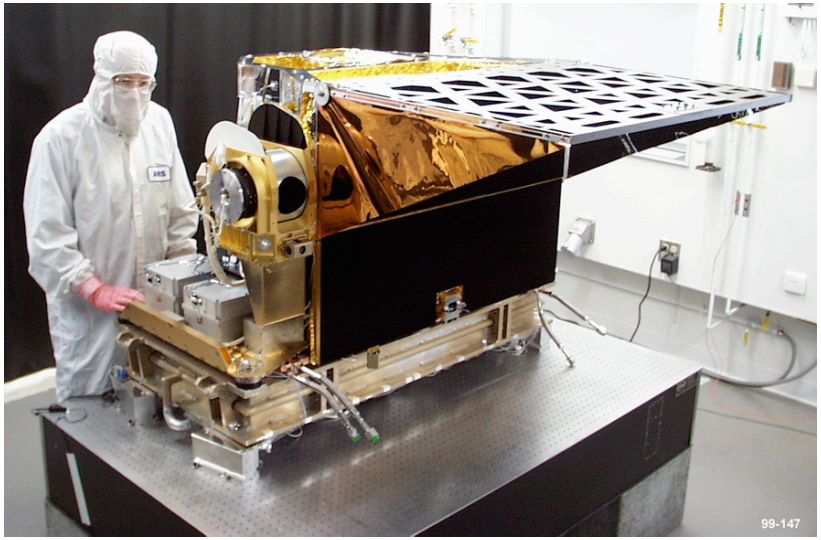
Timeline of Earth Science Missions



*Mission extensions are not assured, but depend on the outcome of a biannual science and satellite performance evaluation

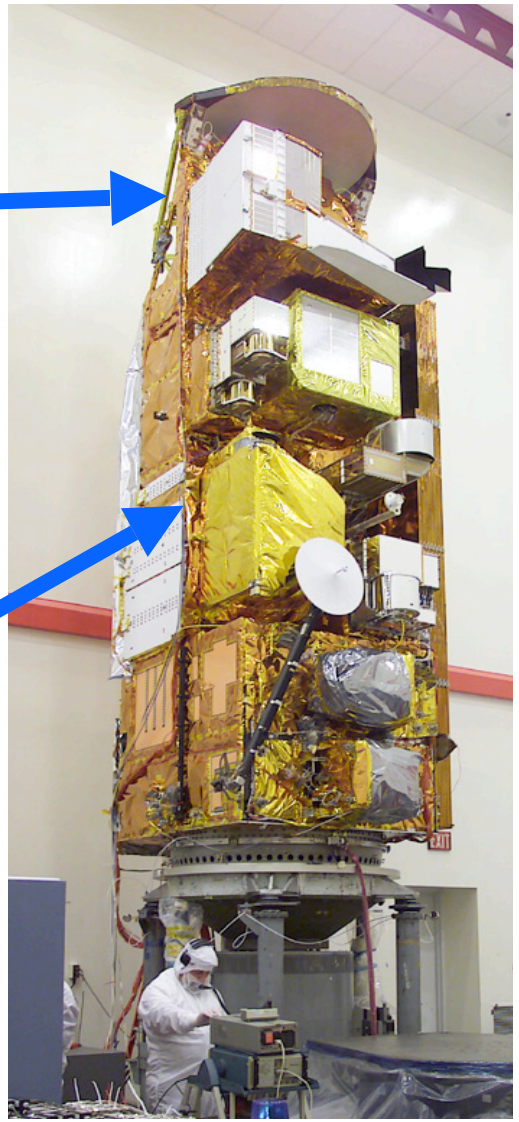
NASA's AQUA SPACECRAFT





MODIS

AIRS

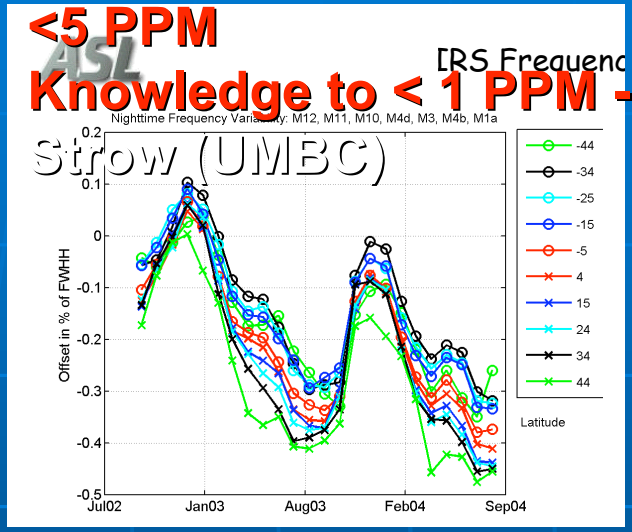


National Aeronautics and Space Administration

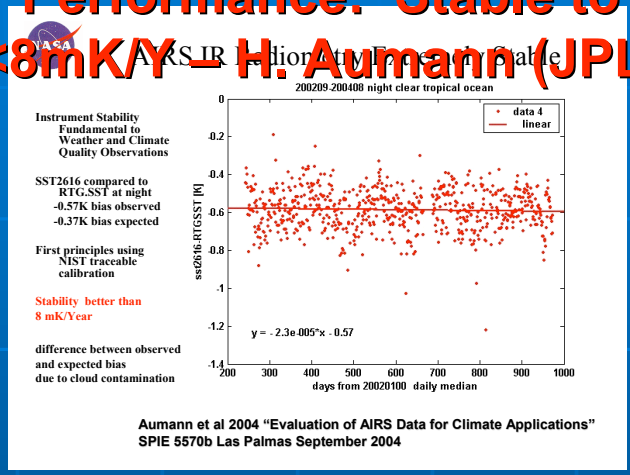
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

AIRS Radiances Accurate and Stable

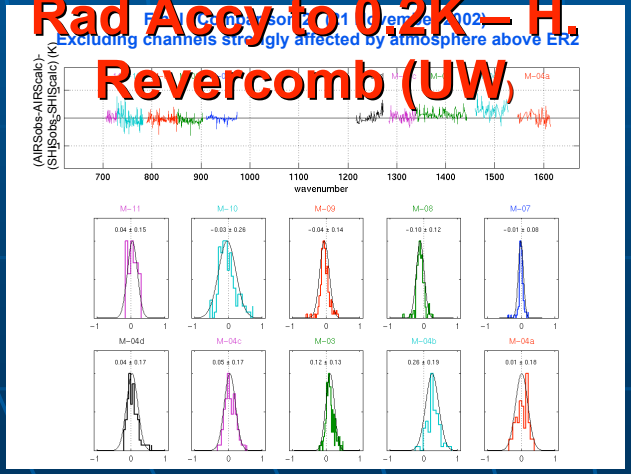
AIRS Frequencies Stable to <5 PPM Knowledge to < 1 PPM - L. Strow (UMBC)



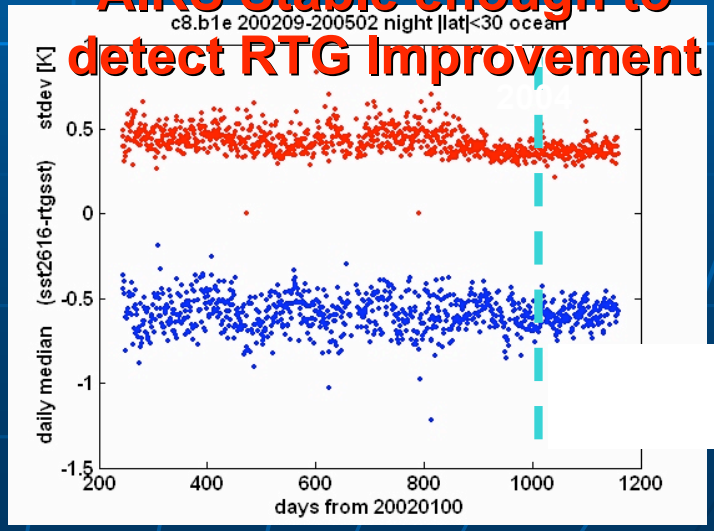
AIRS Radiometric Performance: Stable to <8mK/Y – H. Aumann (JPL)



Scanning HIS Validates Rad Accy to 0.2K – H. Revercomb (UW)

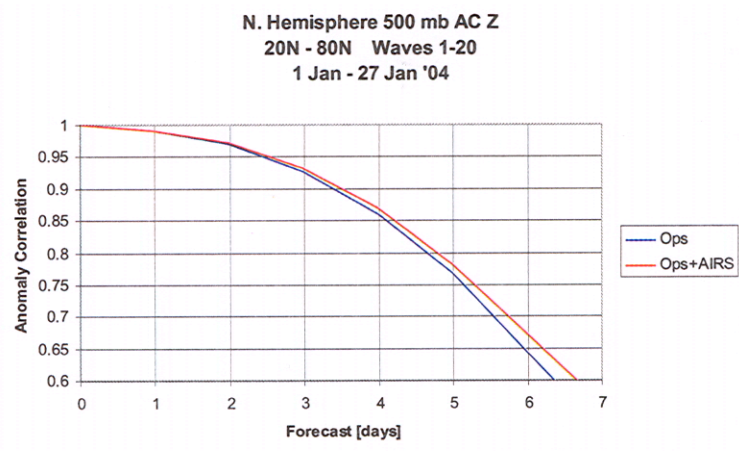


AIRS Stable enough to detect RTG Improvement

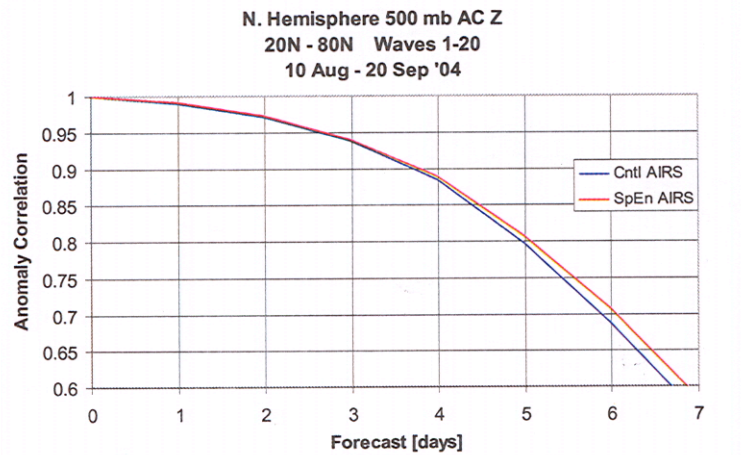


AIRS Forecast Improvement

Improved Forecast Prediction
1 in 18 AIRS FOV's
(6 hours in 6 Days)
Northern Hemisphere
October 2004 *



Additional Improvement Using
All 18 AIRS FOV's
(11 hours total in 6 Days)
Northern Hemisphere
Preliminary

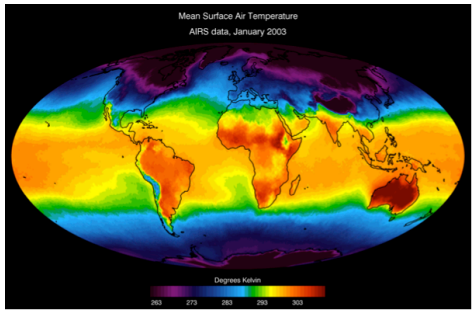


This AIRS instrument has provided a significant increase in forecast improvement in this time range compared to any other single instrument

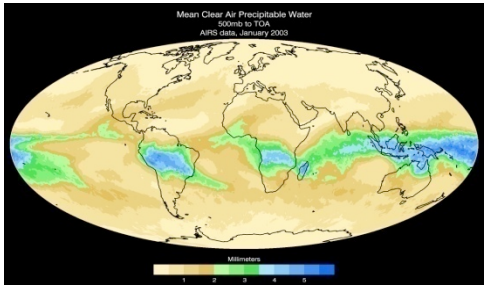
J. LeMarshall, J. Jung, J. Derber, R. Treadon, S. Lord, M. Goldberg, W. Wolf, H. Liu, J. Joiner, J. Woollen, R. Todling, R. Gelaro "Impact of Atmospheric Infrared Sounder Observations on Weather Forecasts", EOS, Transactions, American Geophysical Union, Vol. 86 No. 11, March 15, 2005

AIRS Products

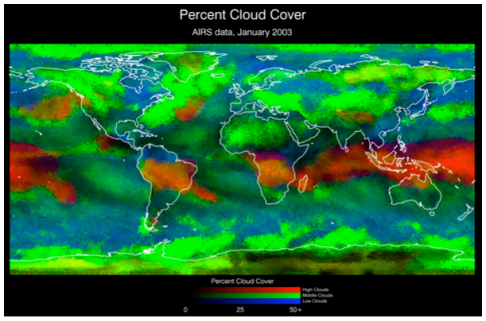
Temperature Profiles



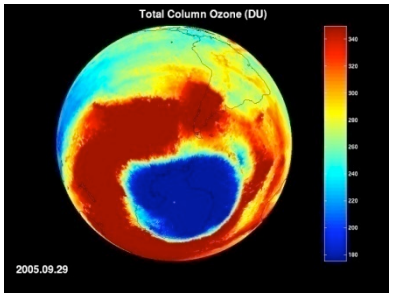
Water Vapor Profiles



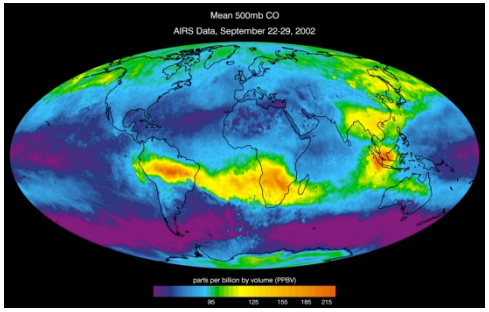
Clouds



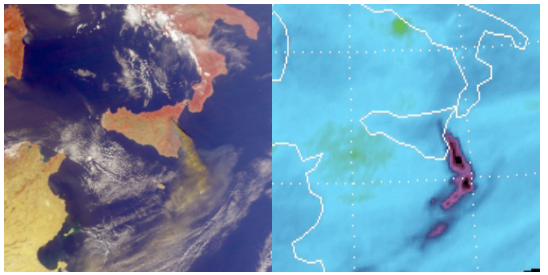
Ozone



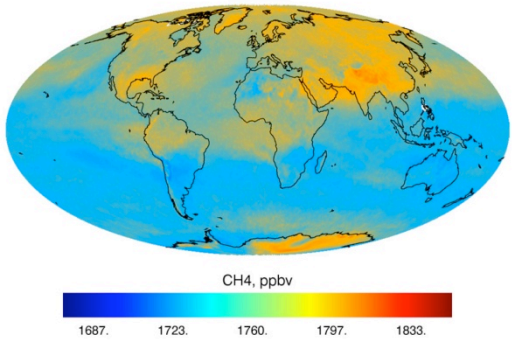
CO



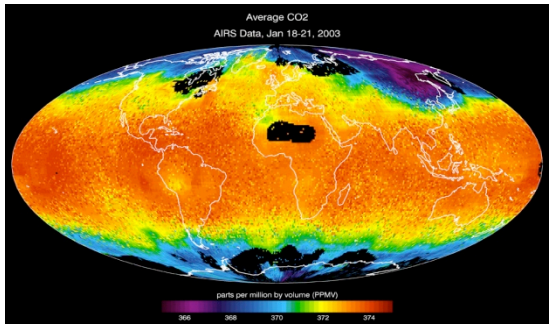
SO2



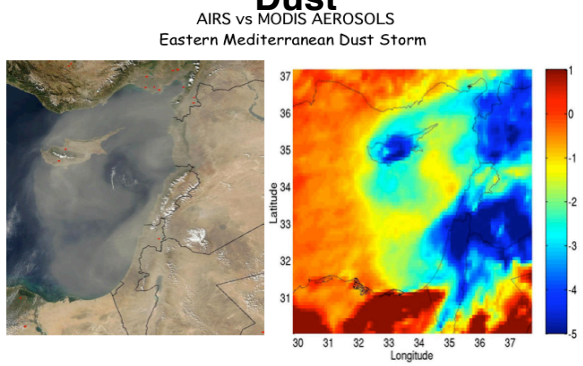
Methane



CO2



Dust



National Aeronautics and Space Administration

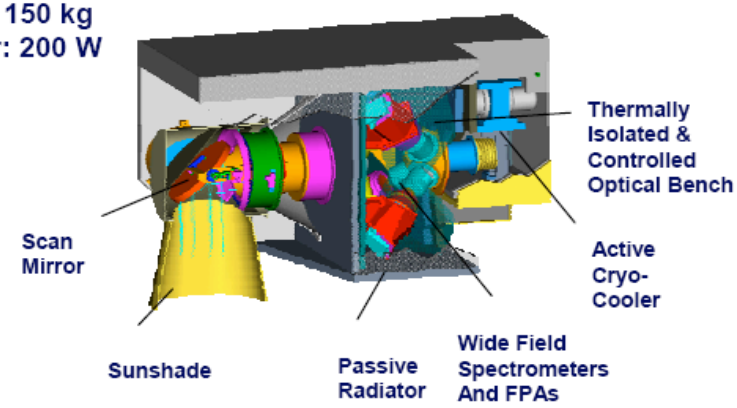
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

ARIES Baseline Concept

Derived under NASA IIP

- Higher Spatial Resolution
  - 1km IFOV (AIRS is 13.5 km)
  - Needed to Resolve the Boundary Layer
- Global Coverage
  - Scans ±55° (AIRS Scans ±49.5°)
- Hyperspectral Resolution
  - 3.4-15.4 μm (AIRS Spectral Range)
  - 2x Better than AIRS at Short Wavelengths, Same at Long Wavelengths
  - >3000 Channels. Channel Selection to reduce Data Rate
- High Accuracy and Stability
  - Proven Observational Technique Employed on AIRS
  - Ensure climate quality observations
- Employ Advanced Technologies (FPA's, Optics, etc.)
  - Benefit from Risk Reduction Effort in NASA's Instrument Incubator Program (IIP)

Size: 0.5 x 0.5 x 1.0 m
Mass: 150 kg
Power: 200 W



Band	Spectral Range	Δν	No. Chans
MW1	2100 - 2950 cm^{-1}	1.0 cm^{-1}	787
MW2	1150 - 1613 cm^{-1}	0.5 cm^{-1}	1000
LW1	880 - 1150 cm^{-1}	0.5 cm^{-1}	637
LW2	650 - 880 cm^{-1}	0.4 cm^{-1}	674

PRELIMINARY

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